Section 3
PILOT AND RADAR REPORTS, SATELLITE PICTURES, AND RADIOSONDE ADDITIONAL DATA (RADATs)

The preceding section explained the decoding of METAR reports. However, these "spot" reports are only one facet of the total current weather picture. Pilot and radar reports, satellite pictures, and radiosonde additional data (RADATs) help to fill the gaps between stations.

PILOT WEATHER REPORTS (PIREPs)

No observation is more timely than the one made from the flight deck. In fact, aircraft in flight are the only means of observing icing and turbulence. Other pilots welcome pilot weather reports (PIREPs) as well as do the briefers and forecasters. A PIREP always helps someone and becomes part of aviation weather. Pilots should report any observation that may be of concern to other pilots. Also, if conditions were forecasted but were not encountered, a pilot should also provide a PIREP. This will help the NWS to verify forecast products and create accurate products for the aviation community. Pilots should help themselves, the aviation public, and the aviation weather forecasters by providing PIREPs.

A PIREP is transmitted in a prescribed format (see Table 3-1). Required elements for all PIREPs are type of report, location, time, flight level, aircraft type, and at least one weather element encountered. When not required, elements without reported data are omitted. All altitude references are mean sea level (MSL) unless otherwise noted. Distance for visibility is in statute miles and all other distances are in nautical miles. Time is in universal coordinated time (UTC).

Table 3-1 PIREP Format

PIREP Format	
UUA/UA	Type of report
OV	Location
TM	Time
FL	Altitude/Flight level
TP	Aircraft type
SK	Sky cover
WX	Flight visibility and weather
TA	Temperature
WV	Wind
TB	Turbulence
IC	Icing
RM	Remarks

Table 3-2 Encoding PIREPs

UUA/UA	**Type of report:** **URGENT (UUA) - Any PIREP that contains any of the following weather phenomena: tornadoes, funnel clouds, or waterspouts; severe or extreme turbulence, including clear air turbulence (CAT); severe icing; hail; volcanic ash: low-level wind shear (LLWS) (pilot reports air speed fluctuations of 10 knots or more within 2,000 feet of the surface); any other weather phenomena reported which are considered by the controller to be hazardous,** **or potentially hazardous, to flight operations.** **ROUTINE (UA) - Any PIREP that contains weather phenomena not listed above, including low-level wind shear reports with air speed fluctuations of less than 10 knots**.
/OV	**Location: Use VHF NAVAID(s) or an airport using the three- or four-letter location identifier. Position can be over a site, at some location relative to a site, or along a route. Ex: /OV ABC; /OV KFSM090025; /OV OKC045020-DFW; /OV KABR-KFSD**
/TM	**Time: Four digits in UTC. Ex: /TM 0915**
/FL	**Altitude/Flight level: Three digits for hundreds of feet with no space between FL and altitude. If not known, use UNKN. Ex: /FL095; /FL310; /FLUNKN**
/TP	**Aircraft type: Four digits maximum; if not known, use UNKN. Ex: /TP L329; /TP B737; /TP UNKN**
/SK	**Sky cover: Describes cloud amount, height of cloud bases, and height of cloud tops. If unknown, use UNKN. Ex: /SK SCT040-TOP080;** **/SK BKNUNKN-TOP075; /SK BKN-OVC050-TOPUNKN;** **/SK SCT030-TOP060/OVC120; /SK FEW030; /SK SKC**
/WX	**Flight visibility and weather: Flight visibility (FV) reported first in standard METAR weather symbols. Intensity (- for light, no qualifier for moderate, and + for heavy) shall be coded for all precipitation types except ice crystals and hail. Ex: /WX FV05SM -RA; /WX FV01SM SN BR; /WX RA**
/TA	**Temperature (Celsius): If below zero, prefix with an "M." Temperature shall also be reported if icing is reported. Ex: /TA 15; /TA M06**
/WV	**Wind: Direction from which the wind is blowing coded in tens of degrees using three digits. Directions of less than 100 degrees shall be preceded by a zero. The wind speed shall be entered as a two- or three-digit group immediately following the direction, coded in whole knots using the hundreds, tens, and units digits.** **Ex: /WV 27045KT; /WV 280110KT**
/TB	**Turbulence: Use standard contractions for intensity and type (CAT or CHOP when appropriate). Include altitude only if different from FL. (See Table 3-3.) Ex: /TB EXTRM; /TB OCNL LGT-MOD BLW 090;** **/TB MOD-SEV CHOP 080-110**
/IC	**Icing: Describe using standard intensity and type contractions. Include altitude only if different from FL. (See Table 3-4.) Ex: /IC LGT-MOD RIME; /IC SEV CLR 028-045**
/RM	**Remarks: Use free form to clarify the report putting hazardous elements first.** **Ex: /RM LLWS -15 KT SFC-030 DURC RWY22 JFK**

Icing and turbulence reports state intensities using standard terminology when possible. To lessen the chance of misinterpretation, report icing and turbulence in standard terminology. If a PIREP stated,

"...PRETTY ROUGH AT 6,500, SMOOTH AT 8,500 PA24...," there could be many interpretations of the strength of the turbulence at 6,500 feet. A report of "light," "moderate," or "severe" turbulence at 6,500 feet would have been more concise and understandable. If a pilot's description of an icing or turbulence encounter cannot readily be translated into standard terminology, the pilot's description should be transmitted verbatim.

TURBULENCE

The following table classifies each turbulence intensity according to its effect on aircraft control, structural integrity, and articles and occupants within the aircraft.

Pilots should report location(s), time (UTC), altitude, aircraft type, whether in or near clouds, intensity, and when applicable, type (CHOP/clear air turbulence [CAT]), and duration of turbulence. Duration may be based on the time the pilot is flying between two locations or over a single location.

High-level turbulence (normally above 15,000 feet AGL) that is not associated with cumuliform clouds (including thunderstorms) shall be reported as CAT.

Table 3-3 Turbulence Reporting Criteria

Intensity	Aircraft Reaction	Reaction Inside Aircraft
Light	**Turbulence that momentarily causes slight, erratic changes in altitude and/or attitude (pitch, roll, yaw). Report as light turbulence or light CAT.** **or** **Turbulence that causes slight, rapid and somewhat rhythmic bumpiness without appreciable changes in altitude or attitude. Report as light CHOP.**	**Occupants may feel a slight strain against belts or shoulder straps. Unsecured objects may be displaced slightly. Food service may be conducted and little or no difficulty is encountered in walking.**
Moderate	**Turbulence that causes changes in altitude and/or attitude occurs but the aircraft remains in positive control at all times. It usually causes variations in indicated airspeed. Report as moderate turbulence or moderate CAT.** **or** **Turbulence that is similar to light CHOP but of greater intensity. It causes rapid bumps or jolts without appreciable changes in aircraft or attitude. Report as moderate CHOP.**	**Occupants feel definite strains against seat belts or shoulder straps. Unsecured objects are dislodged. Food service and walking are difficult.**
Severe	**Turbulence that causes large, abrupt changes in altitude and/or attitude. It usually causes large variations in indicated airspeed. Aircraft may be momentarily out of control. Report as severe turbulence or severe CAT.**	**Occupants are forced violently against seat belts or shoulder straps. Unsecured objects are tossed about. Food service and walking are impossible.**
Extreme	**Turbulence in which the aircraft is violently tossed about and is practically impossible to control.** **It may cause structural damage.** **Report as extreme turbulence or extreme CAT.**	

ICING

The following table classifies each icing intensity according to its operational effects on aircraft.

Pilots should report location(s), time (UTC), altitude, aircraft type, temperature, and icing intensity and type (rime, clear, or mixed). Rime ice is rough, milky, opaque ice formed by the instantaneous freezing of small supercooled water droplets. Clear ice is a glossy, clear, or translucent ice formed by the relatively slow freezing of large supercooled water droplets. Mixed ice is a combination of rime and clear ice.

Table 3-4 Icing Intensities, Airframe Ice Accumulation, and Pilot Report

Intensity	Airframe Ice Accumulation	Pilot Report
Trace	**Ice becomes perceptible. Rate of accumulation slightly greater than rate of sublimation. It is not hazardous even though deicing/anti-icing equipment is not used unless encountered for an extended period of time (over 1 hour).**	**Location, time, altitude/FL, aircraft type, temperature, and icing intensity and type**
Light	**The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour). Occasional use of deicing/anti-icing equipment removes/prevents accumulation. It does not present a problem if the deicing/anti-icing equipment is used.**	**Location, time, altitude/FL, aircraft type, temperature, and icing intensity and type**
Moderate	**The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or diversion is necessary.**	**Location, time, altitude/FL, aircraft type, temperature, and icing intensity and type**
Severe	**The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate diversion is necessary.**	**Location, time, altitude/FL, aircraft type, temperature, and icing intensity and type**

EXAMPLES AND EXPLANATIONS (REFER TO TABLE 3-2):

UUA /OV ORD/TM 1235/FLUNKN/TP B727/TB MOD/RM LLWS +/- 20KT BLW 003 DURD RWY27L

Urgent UA over Chicago O'Hare Airport, Chicago, IL, at 1235Z. Flight level is unknown but the information is from a Boeing 727. Turbulence was moderate and on descent to runway 27 left, low-level wind shear was detected below 300 feet. Airspeed fluctuations were plus and minus 20 knots.

UUA /OV ABQ090045/TM 1430/FL130/TP BE30/TB SEV/RM BROKE ALL THE BOTTLES IN THE BAR

An urgent UA 45 miles east of Albuquerque, NM, a pilot of a Beech King Air 300 reported severe turbulence at 13,000 feet. The pilot remarked the turbulence was so severe it broke all the bottles in the passenger cabin bar.

UA /OV KMRB-KPIT/TM 1600/FL100/TP BE55/SK BKN024-TOP032/BKN-OVC043-TOPUNKN /TA M12/IC LGT-MOD RIME 055-080

This PIREP is decoded as follows: UA, Martinsburg to Pittsburgh, Pennsylvania (PA), at 1600 UTC at 10,000 feet MSL. Type of aircraft is a Beechcraft Baron. First cloud layer is broken with a base at 2,400 feet MSL broken and tops at 3,200 feet MSL. The second cloud layer is broken to occasionally overcast with a base at 4,300 feet MSL, and tops unknown. Outside air temperature is -12 degrees Celsius. Light to moderate rime icing is reported between 5,500 and 8,000 feet MSL.

UA /OV KOKC090064/TM 1522/FL080/TP C172/SK SCT090-TOPUNKN/WX FV05SM HZ/TA M04/WV 24540KT/TB LGT/RM IN CLR.

This PIREP is decoded as follows: UA, 64 nautical miles east of Oklahoma City VOR at 1522 UTC, flight level 8,000 feet MSL. Type of aircraft is a Cessna 172. There is a scattered cloud layer with bases at 9,000 feet MSL and unknown tops. Flight visibility is restricted to 5 statute miles due to haze. Outside air temperature is -4 degrees Celsius, wind is 245 degrees at 40 knots, light turbulence, and the aircraft is in clear skies.

UA /OV KLIT-KFSM/TM 0310/FL100/TP BE36/SK SCT070-TOP110/TA M03/WV 25015KT.

This PIREP is decoded as follows: UA between Little Rock and Fort Smith, Arkansas (AR), at 0310 UTC. A Beech 36 is at 10,000 feet MSL. There is a scattered cloud layer with bases at 7,000 feet MSL, and tops at 11,000 feet MSL. The outside air temperature is -3 degrees Celsius. Winds are from 250 degrees at 15 knots.

UA /OV KABQ/TM 1845/RM TIJERAS PASS CLSD DUE TO FG AND LOW CLDS UNA VFR RTN ABQ.

The PIREP is over Albuquerque at 1845 UTC. The remark section indicates the Tijeras pass is closed due to fog and low clouds. The pilot also mentions that she/he could not continue VFR and returned to Albuquerque.

UA /OV KTOL/TM 2200/FL310/TP B737/TB MOD CAT 350-390.

This PIREP is decoded as follows: UA over Toledo, Ohio, at 2200 UTC and flight level 310, a Boeing 737 reported moderate clear air turbulence between 35,000 and 39,000 feet MSL.

Nonmeteorological PIREPs sometimes help air traffic controllers. This “plain language” report stated:

…/RM 3N PNS LARGE FLOCK OF BIRDS HDG GEN N MAY BE SEAGULLS FRMN …

This PIREP alerted pilots and controllers to a bird hazard.

RADAR WEATHER REPORT (SD)

General areas of precipitation, including rain, snow, and thunderstorms, can be observed by radar. The radar weather report (SD) includes the type, intensity, and location of the echo top of the precipitation. (The intensity trend of precipitation is no longer coded on the SD.) It is important to remember that all heights are reported above MSL. Table 3-5 explains symbols denoting intensity. Radar stations report each hour at H+35.

Example of an SD:

TLX 1935	**LN**	**8**	**TRW++**	**86/40 164/60**	**20W**	**C2425**	**MTS 570 AT 159/65**	**AUTO**
a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**

^MO1 NO2 ON3 PM34 QM3 RL2 =
j.

Above SD report decoded as follows:

a. Location identifier and time of radar observation (Oklahoma City SD at 1935 UTC).
b. Echo pattern (LN in this example). The echo pattern or configuration may be one of the following:
    1. Line (LN) is a line of convective echoes with precipitation intensities that are heavy or greater, at least 30 miles long, at least 4 times as long as it is wide, and at least 25% coverage within the line.
    2. Area (AREA) is a group of echoes of similar type and not classified as a line.
    3. Cell (CELL) is a single isolated convective echo such as a rain shower.
c. Coverage, in tenths, of precipitation in the defined area (8/10 in this example).
d. Type and intensity of weather (thunderstorm [T] with very heavy rainshowers [RW++]).

Table 3-5 Precipitation Intensity

Symbol	Intensity
-	Light
(none)	Moderate
+	Heavy
++	Very Heavy
X	Intense
XX	Extreme

Table 3-6 Symbols Used in SD

Symbol	Meaning
R	**Rain**
RW	**Rain shower**
S	**Snow**
SW	**Snow shower**
T	**Thunderstorm**

Example of an SD:

TLX 1935	LN	8	TRW++	86/40 164/60	20W	C2425	MTS 570 AT 159/65	AUTO
a.	**b.**	**c.**	**d.**	**e.**	**f.**	**g.**	**h.**	**i.**

^MO1 NO2 ON3 PM34 QM3 RL2 =
j.

e. Azimuth, referenced to true north, and range, in nautical miles (NM) from the radar site, of points defining the echo pattern (86/40 164/60 in this echo). For lines and areas, there will be two azimuth and range sets that define the pattern. For cells, there will be only one azimuth and range set. (See the examples that follow for elaboration of echo patterns.)
f. Dimension of echo pattern (20 NM wide in this example). The dimension of an echo pattern is given when azimuth and range define only the center line of the pattern. (In this example, "20W" means the line has a total width of 20 NM, 10 miles either side of a center line drawn from the points given in item "e" above.)
g. Cell movement (cells within line moving from 240 degrees at 25 knots in this example). Movement is only coded for cells; it will not be coded for lines or areas.
h. Maximum top and location (57,000 feet MSL on radial 159 degrees at 65 NM in this example). Maximum tops may be coded with the symbols "MT" or "MTS." If it is coded with "MTS" it means that satellite data as well as radar information was used to measure the top of the precipitation.
i. The report is automated from WSR-88D weather radar data.
j. Digital section is used for preparing radar summary chart.

To aid in interpreting SDs, the five following examples are decoded into plain language.

GRB 1135 AREA 4TRW+ 9/100 130/75 50W C2425 MT 310 at 45/47 AUTO

Green Bay, WI, Automated SD at 1135 UTC. An area of echoes, 4/10 coverage, containing thunderstorms and heavy rain showers. Area is defined by points (referenced from GRB radar site) at 9 degrees, 100 NM and 130 degrees, 75 NM. These points, plotted on a map and connected with a straight line, define the center line of the echo pattern. The width of the area is 50 NM; i.e., 25 NM either side of the center line. The cells are moving from 240 degrees at 25 knots. Maximum top is 31,000 feet MSL located at 45 degrees and 47 NM from GRB.

ICT 1935 LN 9TRWX 275/80 210/90 20W C2430 MTS 440 AT 260/48 AUTO

Wichita, KS, Automated SD at 1935 UTC. A line of echoes, 9/10 coverage, containing thunderstorm with intense rain showers. The center of the line extends from 275 degrees, 80 NM to 210 degrees, 90 NM. The line is 20 NM wide. NOTE: To display graphically, plot the center points on a map and connect the points with a straight line; then plot the width. Since the thunderstorm line is 20 miles wide, it extends 10 miles either side of your plotted line. The thunderstorm cells are moving from 240 degrees at 30 knots. The maximum top is 44,000 feet MSL at 260 degrees, 48 NM from ICT.

GGW 1135 AREA 3S- 90/120 150/80 34W MT 100 at 130/49

Glasgow, MT, Automated SD at 1135 UTC. An area, 3/10 coverage, of light snow. The area's centerline extends from points at 90 degrees, 120 NM to 150 degrees, 80 NM. The area is 34 NM wide. No movement was reported. The maximum top is 10,000 feet MSL, at 130 degrees, 49 NM.

MAF 1135 AREA 2TRW++6R- 67/130 308/45 105W C2240 MT 380 AT 66/54

Midland/Odessa, TX, Automated SD at 1135 UTC. An area of echoes, total coverage 8/10, with 2/10 of thunderstorms with very heavy rainshowers and 6/10 coverage of light rain. (This suggests that the thunderstorms are embedded in an area of light rain.) The area lies 52½ miles either side of the line defined by the two points, 67 degrees, 130 NM and 308 degrees, 45 NM.

When an SD is transmitted but does not contain any encoded weather observation, a contraction is sent which indicates the operational status of the radar.

Example:
TLX 1135 PPINE AUTO

It is decoded as Oklahoma City, OK's, radar at 1135 UTC detects no echoes.

Table 3-7 Operational Status Contractions

Contraction	Operational Status
PPINE	**Radar is operating normally but there are no echoes being detected.**
PPINA	**Radar observation is not available.**
PPIOM	**Radar is inoperative or out of service.**
AUTO	**Automated radar report from WSR-88D.**

All SDs also contain groups of digits.

Example:
^MO1 NO1 ON3 PM34 QM3 RL2 SL1=

These groups of digits are the final entry on the SD. This digitized radar information is used primarily in preparing the radar summary chart. However, by using a proper grid overlay chart for the corresponding radar site, this code is also useful in determining more precisely where the precipitation is occurring within an area as well as the intensity of the precipitation. (See Figure 3-1 for an example of a digital code plotted from the Oklahoma City, OK, SD.)

The digit assigned to a box represents the intensity of precipitation as determined by the WSR-88D and is the maximum precipitation intensity found within the grid box. (See Table 7-2 for definitions of precipitation intensities associated with digits 1 through 6.) These digits were once commonly referred to as VIP levels because precipitation intensity, and therefore the digits, was derived using a video integrator processor (VIP). Since the WSR-88D and not the video integrator processor is now used to determine precipitation intensity, it is suggested that the term VIP should no longer be used when describing precipitation intensity. For example, if a specific grid has the number 2 associated with it, that grid would be described as having moderate precipitation, not VIP level 2 precipitation.

A box is identified by two letters, the first representing the row in which the box is found and the second letter representing the column. For example "MO1" identifies the box located in row M and column O as containing light precipitation. A code of "MO1234" indicates precipitation in four consecutive boxes in the same row. Working from left to right box MO = 1, box MP = 2, MQ = 3 and box MR = 4.

When using hourly SDs in preflight planning, note the location and coverage of echoes, the type of weather reported, the intensity, and especially the direction of movement.

It is important to remember that the SD contains information pertaining to the location of particles in the atmosphere that are of precipitation size or larger. It does not display locations of cloud-size particles, and, therefore, neither ceilings nor restrictions to visibility. An area may be blanketed with fog or low stratus, but the SD would not include information about it. Pilots should use SDs along with METARs, satellite photos, and forecasts when planning a flight.

The SDs help pilots plan ahead to avoid thunderstorm areas. Once airborne, however, pilots must depend on contact with Flight Watch, which has the capability to display current radar images, airborne radar, or visual sighting to evade individual storms.

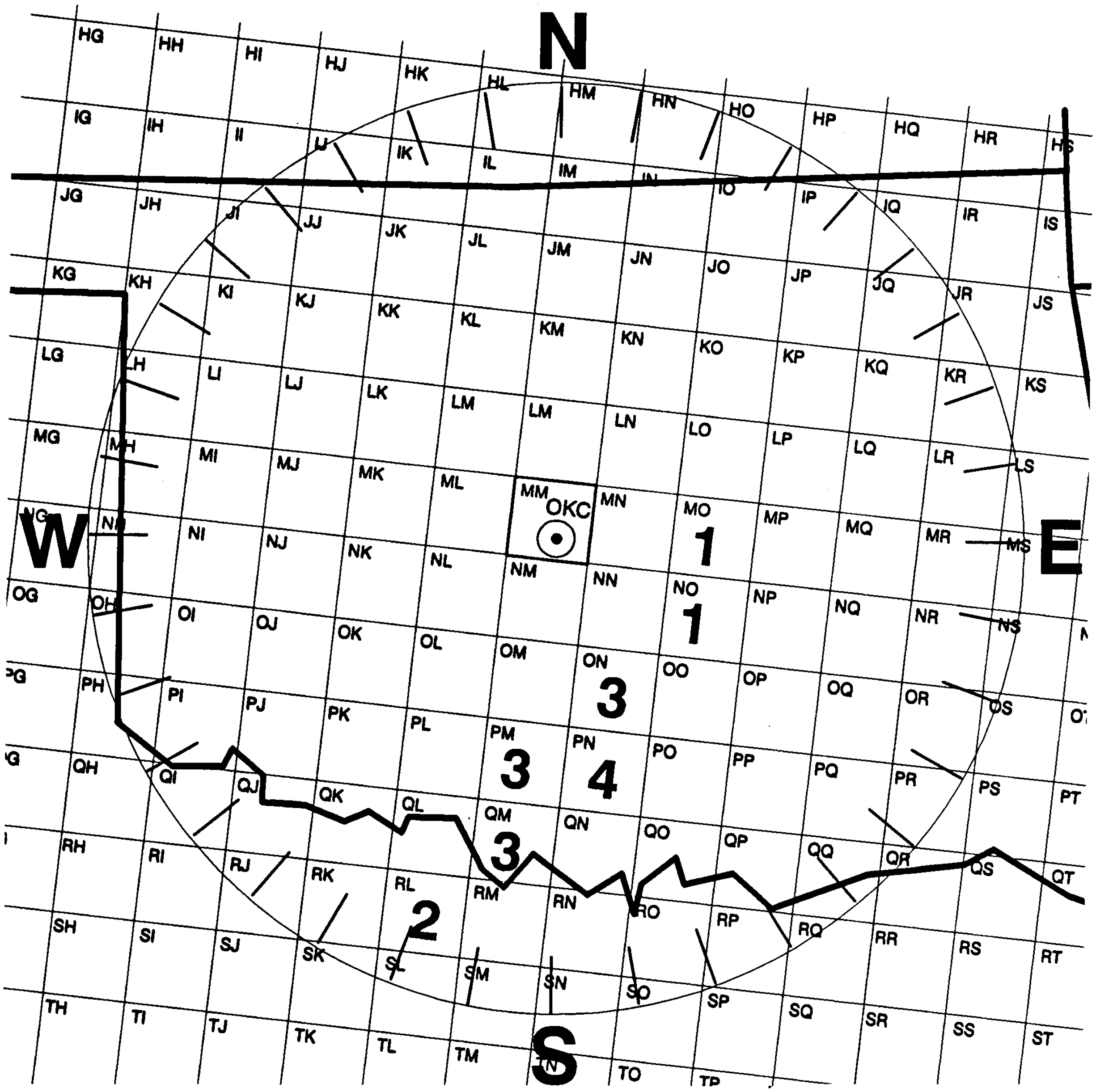

Figure 3-1. Digital Radar Report Plotted on a PPI Grid Overlay Chart.
(Note: See Table 7-2 for Intensity Level Codes 1 through 6.)

SATELLITE WEATHER PICTURES

Prior to weather satellites, weather observations were made only at distinct points within the atmosphere and supplemented by PIREPs. These PIREPs gave a “sense” of weather as viewed from above. However, with the advent of weather satellites, a whole new dimension to weather observing and reporting has emerged. There are two types of weather satellites in use by the U. S. today: Geostationary Operational Environmental Satellite (GOES), which is a geostationary satellite, and the Polar Orbiter Environmental Satellite (POES). Additional satellite imagery is available from the European Meteosat and the Japanese GMS geostationary satellites.

Two U.S. GOES satellites are used for imaging. One is stationed over the equator at 75 degrees west longitude and is referred to as GOES EAST since it covers the eastern U.S. The other is positioned at 135 degrees west longitude and is referred to as GOES WEST since it covers the western U.S. Together they cover North and South America and surrounding waters. They normally transmit an image of Earth, pole to pole, every 15 minutes. When disastrous weather threatens the U.S., the satellites can scan small areas rapidly so that a picture can be received as often as every 1 minute. Data from these rapid scans are used at NWS offices.

Since the GOES satellite is stationary over the equator, the images poleward of about 50 degrees latitude become greatly distorted. For images above 50 degrees latitude, polar orbiting satellites are employed. The NOAA satellite is a polar orbiter and orbits the earth on a track that nearly crosses the North and South poles. A high resolution picture is produced about 500 miles either side of its track on the journey from pole to pole. The NOAA pictures are essential to weather personnel in Alaska and Canada.

Two types of imagery are available from satellites, and, when combined, give a great deal of information about clouds. Through interpretation, the analyst can determine the type of cloud, the temperature of cloud tops (from this, the approximate height of the cloud can be determined), and the thickness of cloud layers. From this information, the analyst gets a good idea of the associated weather.

One type of imagery is visible (Figure 3-2). A visible image shows clouds and Earth reflecting sunlight to the satellite sensor. The greater the reflected sunlight reaching the sensor, the whiter the object is on the picture. The amount of reflectivity reaching the sensor depends upon the height, thickness, and ability of the object to reflect sunlight. Since clouds are much more reflective than most of the Earth, clouds will usually show up white on the picture, especially thick clouds. Thus, the visible picture is primarily used to determine the presence of clouds and the type of cloud from shape and texture. Due to the obvious lack of sunlight, there are no visible images available at night.

The second type of imagery is infrared (IR) (Figure 3-3). An IR picture shows heat radiation being emitted by clouds and Earth. The images show temperature differences between cloud tops and the ground, as well as temperature gradations of cloud tops and along the Earth’s surface. Ordinarily, cold temperatures are displayed as light gray or white. High clouds appear the whitest. However, various computer-generated enhancements are sometimes used to sharply illustrate important temperature contrasts. IR images measure cloud top temperatures and are used to approximate the height of clouds. From this, one can see the importance of using visible and IR imagery together when interpreting clouds. IR images are available both day and night.

Satellite images are processed by the NWS as well as by many private companies. Therefore, they can be received from many different sources. Depending upon the source, satellite images may be updated anywhere from every 15 minutes to every hour; therefore, it is important to note the time on the images when interpreting them. By viewing satellite images, the development and dissipation of weather can be seen and followed over the entire country and coastal regions.

NESDIS is developing the capability to provide derived products useful to aviation from satellite data. These experimental products are available via the Internet and include:

1. Fog and low cloud coverage and depth.
2. Volcanic ash detection.
3. Microburst products.
4. Soundings.
5. Clear air turbulence.
6. Aircraft icing potential.

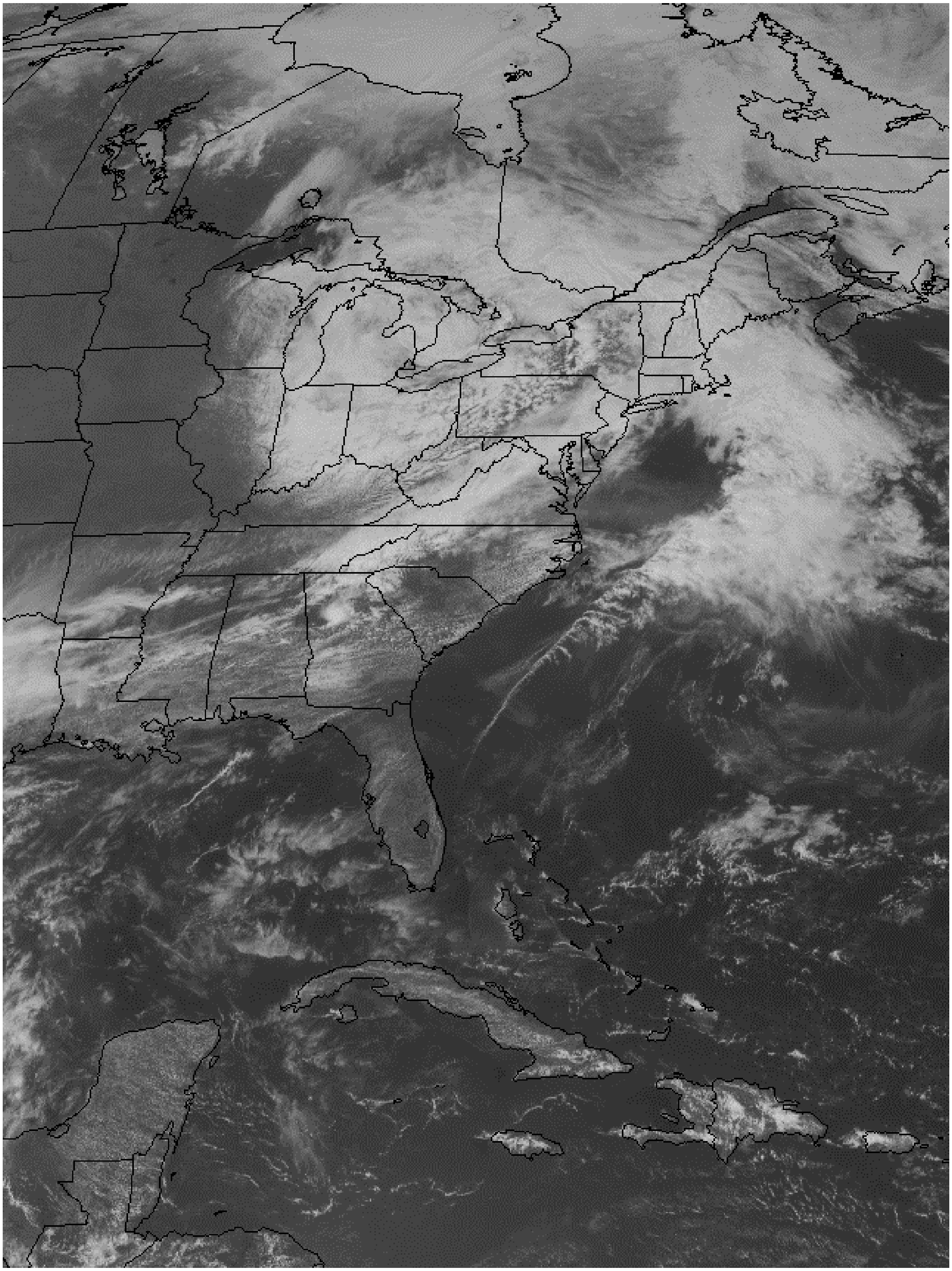

Figure 3-2. Visible Satellite Imagery.

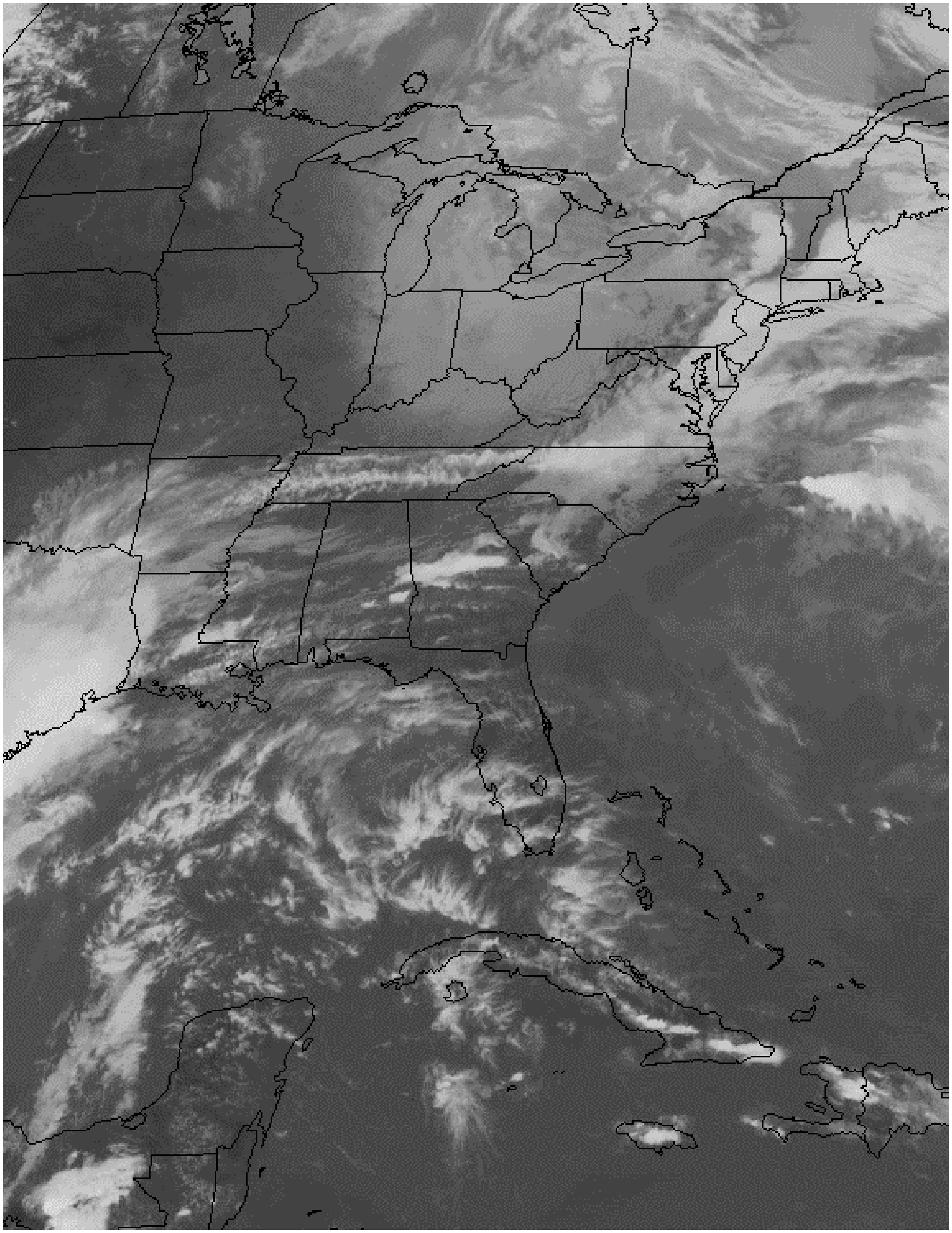

Figure 3-3. Infrared Satellite Imagery.

RADIOSONDE ADDITIONAL DATA (RADATs)

Radiosonde Additional Data (RADATs) information is obtained from the radiosonde observations that are conducted twice a day at 00 and 12Z. The information contained in a RADAT is the observed freezing level and the relative humidity associated with the freezing level. The freezing level is the height above MSL at which the temperature is zero degrees Celsius.

The format associated with the RADAT is as follows:
Stn ID Time RADAT UU (D) (hhh)(hhh)(hhh)(/n)

Explanation:
Stn ID and Time - standard three-letter identifier and observation time in UTC.

RADAT - a contraction identifying the data as "freezing-level data."

UU - relative humidity at the freezing level in percent. When more than one level is identified, "UU" is the highest relative humidity observed at any of the levels transmitted.

(D) - a coded letter "L," "M," or "H." used in the event of multiple freezing levels to identify which level has the highest relative humidity, "L – lowest," "M – middle," "H – highest." This letter is omitted when only one level is coded.

(hhh) – height of the freezing level in hundreds of feet. Up to three freezing levels can be specified in the event of multiple freezing levels. If there are more than three freezing levels, the levels coded are the lowest, highest, and the intermediate level with the highest relative humidity.

(/n) – an indicator to show the number of freezing levels in addition to the three which are coded. The number is omitted when all observed freezing levels are coded (three or less.)

Examples:
SJU 1200 RADAT 87160
The San Juan, Puerto Rico, RADAT indicates that the freezing level was 16,000 feet MSL and the relative humidity was 87% at the freezing level.

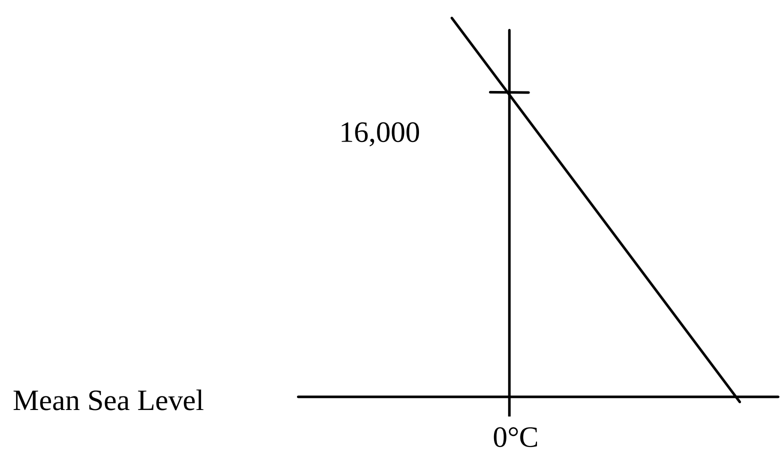

Figure 3-4. SJU RADAT.

OUN 0000 RADAT 87L024105
The Norman, Oklahoma, RADAT indicates that the freezing level was crossed twice. The two crossings occurred at 2,400 feet MSL and at 10,500 feet MSL. The 87L indicates that the relative humidity was 87% at the lowest crossing (indicated by the L).

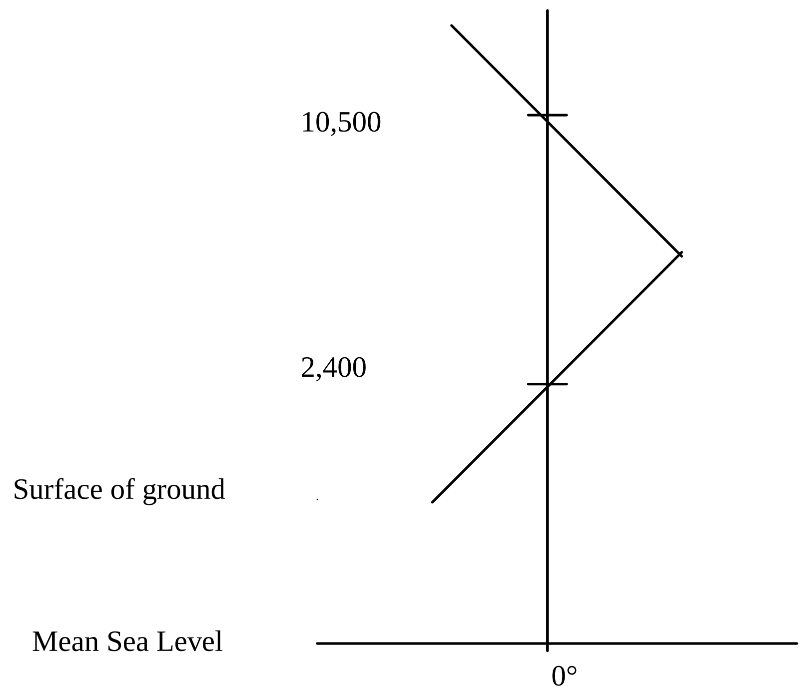

Figure 3-5. OUN RADAT.

ALB 1200 RADAT 84M019045051

The Albany, New York, RADAT indicates three crossings of the freezing level. The three crossings of the zero-degree Celsius isotherm occurred at 1,900 feet MSL, 4,500 feet MSL, and at 5,100 feet MSL. The relative humidity was 84% at the middle crossing which was 4,500 feet MSL.

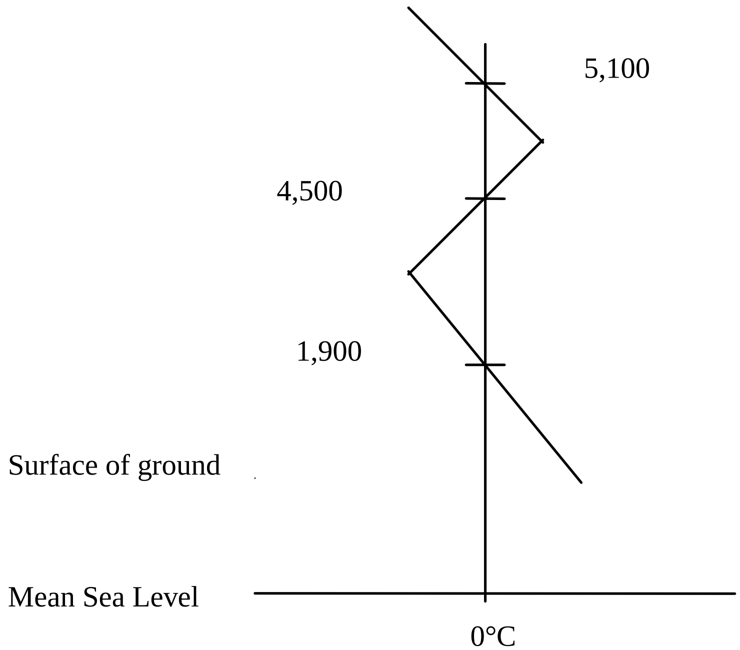

Figure 3-6. ALB RADAT.

DNR 1200 RADAT ZERO

The Denver, Colorado, RADAT indicates that the entire RADAT information was below zero degrees Celsius.

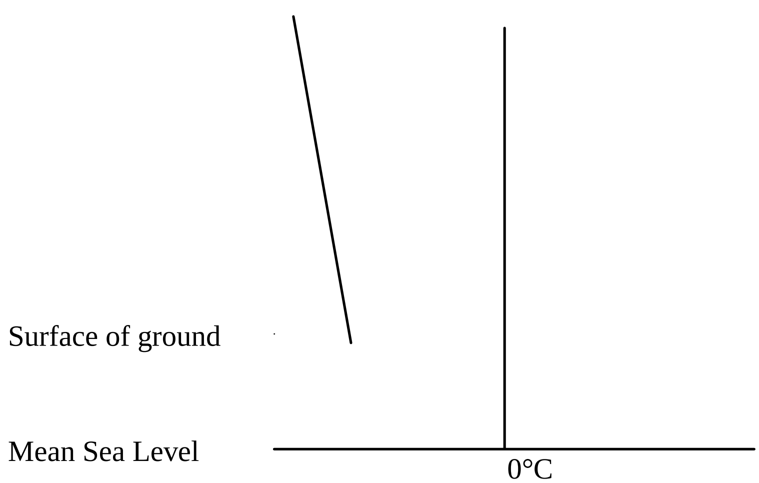

Figure 3-7. DEN RADAT.

ABR 0000 RADAT MISG
The Aberdeen, South Dakota, RADAT was terminated before the first crossing of the zero-degree Celsius isotherm. All temperatures were above freezing.

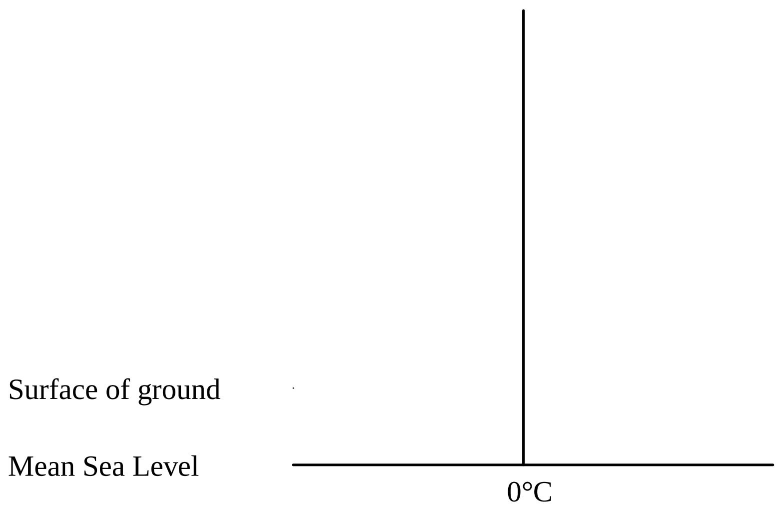

Figure 3-8. ABR RADAT.